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CRITICAL FIRE SEASON INDICATED FOR 1945 IN THE NORTHERN ROCKY MOUNTAIN REGION

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In the everyday language of forest fire control, fire seasons are either easy, average, or critical. Adequate control of fires at reasonable cost now can be guaranteed for easy and average seasons, but when burning conditions become severe in May or June and remain critical throughout July and August even the best-manned, best-trained, and best-equipped fire control organization so far developed is likely to get "caught short" of men or equipment. Under such conditions the area burned usually exceeds the "permissible" standards, while costs of suppression skyrocket sometimes beyond the value of the resources on the area burned.

Under critical burning conditions it is essential, first, to fight each fire to the limit of available manpower and facilities and, second, to be prepared with more reserves than are ordinarily justified. Otherwise the area burned over and the timber, logging equipment, sawmills, homesteads, hamlets, towns, and human lives lost may amount to a catastrophe of 50 to 100 years' duration for the community, the state, and even the nation. Furthermore, the losses during the critical years often wipe out most of the benefits obtained during easy and average seasons. In our perpetual war against forest fires, it is useless to win the minor struggles of the easy and average seasons and then lose the more significant battles of the critical years. To lose the battle of the critical years is to lose the war against fire in this region.

Because of these conditions all foresters have always wished for forecasts which would indicate, a few months in advance, whether the coming fire season is likely to be easy, average, or critical. In the past some foresters have been so sure of their personal hunches that they have done what they could to build up their fire control organizations beyond normal levels to meet the feared danger whenever they "felt that way." Others have watched the deficiency of snow in the mountains, the early opening of spring, the development of exceptional drouth in April and May,

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and have then concluded that with such a bad start the following fire season should be expected to be critical. Sometimes it was. Sometimes, however, as in 1944, June rainfall would equal or surpass all previous records, or the rains of July and August, though only moderate in amount, would be so well distributed that before the woods could dry out to high inflammability they would be wetted down again. Still other foresters, including the writer, have compiled precipitation data, hunting for cycles which would indicate when the probability of summer drouth would be greatest and when least. But no system worthy of being called a system has ever yet been found which would dependably predict, even a few weeks ahead, any of the major weather elements - drouth, temperature, and wind - which combine to make critical burning conditions.

Some 17 years ago Mr. Robert W. Strong, then clerk on the Kootenai National Forest, discovered a remarkable correlation between November precipitation at Libby, Montana and the acreage burned during the following summer on the surrounding Kootenai Forest. The records showed that the drier the November the more area burned during the following fire season. Statistical analysis indicated that such remarkably close correlation would be expected according to the laws of chance only once in 60,000 times. One explanation was that a wet November soaked the fuels so well that they had a reservoir of moisture lasting even through the following July and August, but this cause and effect relationship is not verified by other fire research measurements. Some natural law seemed to be operating, nevertheless, regardless of whether or not November precipitation could be the major control of burning conditions 6 to 8 months later. However, in 1930 when a critical fire season failed to follow the critically dry November of 1929 and when a critical fire season did occur in 1931 following a November that had more than half its normal precipitation, this "system" aroused the doubts and misgivings of even its own discoverer.

No system can be expected to be absolutely infallible. Furthermore, there seemed to be a possibility that one of the weaknesses in the original system lay in the use of data for only one station. Hence a compilation was made by our Division of Fire Research using November precipitation for 15 stations instead of one. These were chosen in North Idaho because other studies had indicated a transitional zone in western Montana exhibiting more erratic variations than are present in the North Idaho records. The records for Spokane, Washington were added, thereby giving 16 stations as a base.

Compilations were commenced with the records of November 1918 because previous to that too many of the 16 stations lacked normals or averages for 10 or more years. Departures from normal for the 16-station average were then computed and when they were arranged in order on the basis of departure from normal, a most remarkable fact appeared. All of the fire seasons which are universally recognized in this region as having

been critical fell in one unbroken group, preceded by Novembers having from 52 to 64 percent of normal. No critical season was preceded by a November having any other percentage of normal, and no easy or average season has ever occurred when preceded by a November having 52 to 64 percent of normal. This relation or coincidence is shown by the following table in which the well-known and universally recognized critical seasons are underlined.

Percent of normal November precipitation:	Following fire season	Percent of normal November precipitation	Following fire season	Percent of normal November precipitation:	Following fire season
Percent	Year	Percent	Year	Percent	Year
6	1930	52	1926	74	1921
8	1937	55	1929	75	1939
25	1940	56	1934	85	1942
32	1923	61	1919	90	1924
36	1944	64	1931	91	1920
42	1936			99	1932
		64	1945	101	1941
		for Nov.		105	1935
		1944		126	1922
				139	1925
				142	1938
				143	1927
				158	1933
				161	1943
				203	1928

From this arrangement of data it is immediately evident that November precipitation itself is not a factor influencing the character of the following fire season. Instead the relationship is merely "coincidental" or one which repeats so dependably that one condition can be used to forecast the other. It might be likened to the coincidence that every morning when you ride a certain bus to get to your office you will meet, at a certain downtown corner, another person entirely unknown to you, getting on the bus which you have just left or walking up the street down which you are going. Your ride on the bus has had no effect whatever on this other person, but certain conditions which control your rides also control the other person's whereabouts and activities at certain hours on certain days. Your activities are not the "cause" and the other person's activities the "effect." The two are mere coincidences. If there are not too many exceptions or violations of the rule, one event becomes usable as an index of the other. Eventually someone may discover the over-all cause but the rule is nevertheless usable even without this understanding.

From such a coincidence of data, first discovered in 1937, the following three rules were evident: (1) Following a November having from 52 to 64 percent of normal precipitation, expect a critical fire season. (2) Following a November having less than 43 percent or more than 73 percent, expect a noncritical season, i.e., easy or average. (3) Following Novembers of 43 to 51 percent and 65 to 73 percent, no evidence is available as to what to expect.

Beginning in April 1938 tests of these rules were commenced by publishing a "guesstimate" of the coming fire season in our Forest Service "Northern Region News." These were recorded annually in the issues of the News for April 6, 1938; April 21, 1939; March 6, 1940; March 6, 1941; March 21, 1942; April 27, 1943; and February 21, 1944. In each of these cases a non-critical season was predicted. While 1940 brought an abnormally large number of fires, neither that season nor any of the others for which guesstimates were issued were burning conditions similar to those of the critical seasons 1919, 1926, 1929, 1931, and 1934. The rules, therefore, appear to be reasonably dependable, with no errors so far.

Now, however, for the first time since these guesstimates were commenced, we have a November precipitation which indicates a critical season. The average precipitation for November 1944 for the 16 standard stations amounted to 2.49 inches. This is 64 percent of the present "normal" of 3.89 inches, which has been used as an index of the 1943 and 1944 seasons. It is 67 percent of the normal used previous to 1943. The indication is obvious: Without injecting any personal opinion or bias, the system clearly predicts critical burning conditions in 1945 throughout the northern Rocky Mountain region.

For reasons of national safety it is recommended that the present indication be withheld from widespread publication in newspapers or magazines.